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CliPick - Climate Change Web Picker

Bridging climate and biological modeling scientific communities

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Introduction

Climate change impact is a transversal assessment in different studies. However, there is often a complex pathway, usually requiring programming skills, from the need to the **usage of climate data** for different kind of modeling purposes.

NETCDF binary file formats, with sizes of more than 300 MB, at European or planetary scale, including oceanic data may **pose a barrier** for usage of climate scenarios in biological modelling at local scale needing only some climatic variables.

In the context of the EU collaborative project AGFORWARD (2014-2017), agroforestry process-based models are being used to provide field and farm scale evaluation of different agroforestry systems, including an **assessment of the impact of future climate** throughout Europe.

A tool, called **CliPick**, is proposed to provide a **user-friendly interface** accessing climate datasets developed under the IPCC framework.

Interface

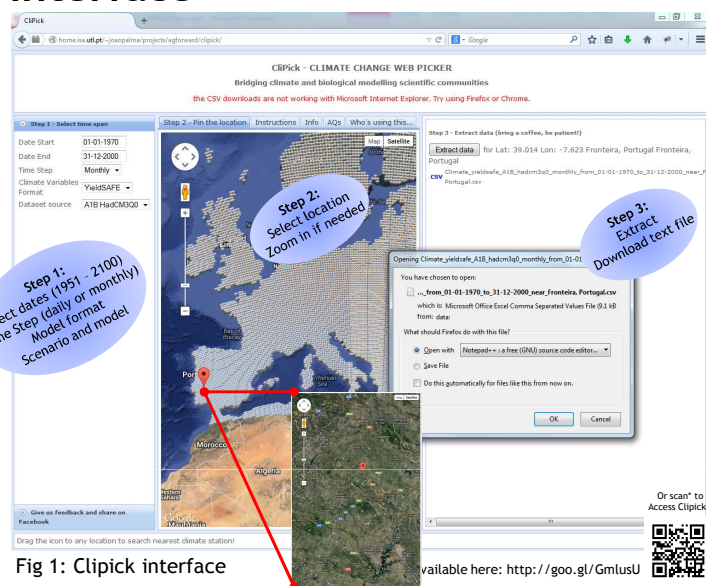


Fig 1: Clipick interface

Results and Discussion

- Usage of the interface is being compared for several locations within the AGFORWARD project. So far the comparisons have provided good indications that this climate database could be used for climate driven agroforestry modelling assessments (Fig 2).
- The resolution of the dataset is 25 km. Caution should be taken for study areas where known geomorphology or closeness to seashore is likely to influence climate
- Scenario A1B is considered a moderate climate change scenario that is being widely used by the scientific community. However, the architecture is ready to add other ENSEMBLES datasets if needed.
- Given the (arguable) complexity of NETCDF files usage, Clipick provides an alternative to access future climate scenarios for biological modelling purposes requiring simpler and human readable information.

Material

- **Source of climate datasets:** The ENSEMBLES datasets repository (<http://www.ensembles-eu.org/>), used to supply climate scenarios for the International Panel on Climate Change (IPCC).
- **Scenario and Model:** A1B and HadRM3Q0. This initial scenario and model chosen was based on its suitability to Portugal but is being used widely throughout Europe.
- **Eight climate variables:** minimum, mean and maximum temperature, precipitation, radiation, minimum and maximum relative humidity and wind speed. **Daily** data is retrieved and **monthly** data is calculated accordingly.
- Each climate variable is stored in the original **NETCDF** format. Each file has 10 years of data, so there are 15 decade blocks (1951-2100). Each decade has about 450 MB (daily data). In total there are **about 54GB** of data for a climate scenario, for the eight climate variables. The spatial resolution is 25 km.

Method

- Clipick was developed as a **web based interface** using ECLIPSE interface development environment (IDE)
- Programming languages: Python, JavaScript and PHP, XML and HTML
- Application Programming Interfaces (API): Google Maps v3, DOJO 1.7.5 and JQuery 1.10.3
- **Data processing:**
 - Each climate variable is stored in the original NETCDF format. Each file has 10 years of data, so there are 15 decade blocks (1951-2100). Each decade has about 450 MB (daily data). In total there are about 54GB of data for a climate scenario, for the eight climate variables.
 - A query is built based on the user inputs in the interface and a parallel request procedure in the server trough PHP and Python is executed, gathering the climate data for the dates' span selected.

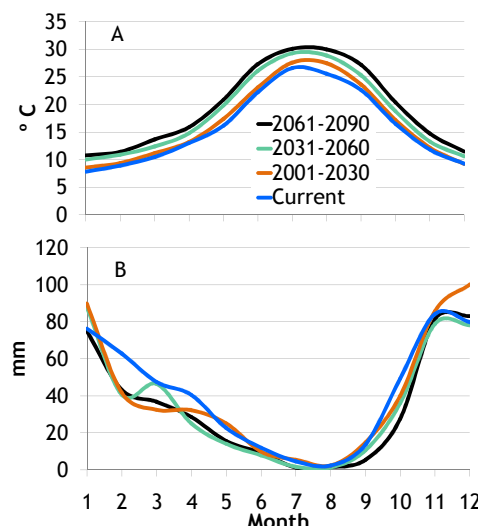


Figure 2: Interpreting climate results from clipick. Example for a comparison of current and future temperature (A) and rain (B) for Faro, South Portugal